State of Power Sector in the GCC and Key Lessons Learnt in Oman

By Lim Yeow Keong
CEO, Sembcorp Salalah Power & Water Company SAOG (Oman)

8th July 2015
General Characteristics of GCC Power Sector

- Transmission & Distribution
  - Government Owned
- Power Generation
  - Government Owned
  - Privatized with long term PPAs/PWPAs with a single Buyer
- Mainly oil and gas fired
- Heavily subsidized fuel and/or consumer tariffs
  - Different level of subsidies in all countries
GCC Interconnection Power Grid
Alternative Source Of Operating Reserves And Support During Emergencies

Managed by GCC Interconnection Authority (GCCIA)
Oman to chart road map for electricity spot market

**Objectives/Benefits:**
- Alternative route for gencos to sell power to OPWP outside PPA/PWPA
- An mechanism to access uncontracted power capacity
- Objective basis to evaluate contract renewals, life extension, plant configuration options, strategies for renewable energy
- Prepares Oman for electricity trading across GCC

**Market Features**
- Qualified Gencos will receive market prices on a daily basis and participate in spot market within market rules
- OPWP - Market Operator cum Single Power Purchaser
- Market rules expected to be similar to those developed internationally with customization to local requirements

**Timeline**
- 2017 target for trial test of spot market and full fledged operation by 2020
Renewables in GCC

Gaining Importance But Cheap Oil Will Slow Rise

- Main driver for renewables is to diversify the energy mixes to reduce domestic consumption of hydrocarbons to free up for exports.
- Renewable generation cost steadily declining. Recent 200MW photovoltaic solar IPP in Dubai raise eyebrows with an attractive levelised tariff of 5.8 US cents/kWh.
- Sharp decline in oil prices unlikely to affect the rise of renewable energy as these long term and strategic considerations are set to prevail.
- Delays in progress of renewables due to policy and institutional factors, rather than market forces.
- UAE powering ahead with renewable energy programme. Saudi Arabia appears to scale back on ambitious 54GW Atomic & Renewable Energy plans (KA-Care) made in 2013.

MAJOR PLANNED RENEWABLES PROJECTS IN THE GCC

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Location</th>
<th>Project owner</th>
<th>Budget ($m)</th>
<th>Technology</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohammed bin Rashid al-Maktoum solar park: phase 2</td>
<td>Dubai</td>
<td>Dewa</td>
<td>272</td>
<td>Photovoltaic (PV) solar</td>
<td>100</td>
</tr>
<tr>
<td>Noor 1 plant</td>
<td>Abu Dhabi</td>
<td>Masdar</td>
<td>400</td>
<td>PV solar</td>
<td>100</td>
</tr>
<tr>
<td>Duba integrated solar combined-cycle (ISCC) power plant</td>
<td>Saudi Arabia</td>
<td>Saudi Electricity Company</td>
<td>600</td>
<td>Concentrated solar power (CSP)</td>
<td>550 (of which 40-50 solar)</td>
</tr>
<tr>
<td>Shagaya renewable energy project: phase 1</td>
<td>Kuwait</td>
<td>MEW/KISR</td>
<td>550</td>
<td>CSP</td>
<td>50</td>
</tr>
<tr>
<td>Harweel wind farm</td>
<td>Oman</td>
<td>Masdar</td>
<td>200</td>
<td>Wind</td>
<td>50</td>
</tr>
<tr>
<td>Ras al-khaimah solar power plant</td>
<td>Ras al-Khaimah</td>
<td>Utico</td>
<td>225</td>
<td>PV solar</td>
<td>40</td>
</tr>
<tr>
<td>Al-Abdaliya ISCC power plant</td>
<td>Kuwait</td>
<td>KPAPPP</td>
<td>720</td>
<td>CSP</td>
<td>280 (of which 60 solar)</td>
</tr>
</tbody>
</table>

“Prices are always volatile; they are just as likely to go up as down. But for long-term investments, you have to think what are the costs going to be over 20 years. The advantage with renewables is that you can lock in costs over that time period and you are not exposed to price volatility.”

Michael Taylor, International Renewable Energy Agency
### GCC undeterred by volatile oil prices

<table>
<thead>
<tr>
<th>Country</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>1.6GW Fadhili IPP, 240 MW PP9 IPP</td>
</tr>
<tr>
<td>Oman</td>
<td>3.2GW Sohar/Ibr IPP, 60 MiGD Sohar IWP, 60 MiGD Barka IWP, 40 MiGD Quriyat IWP</td>
</tr>
<tr>
<td>UAE</td>
<td>400MW Salalah 2 IPP, 22 MiGD Salalah IWP, 12 MiGD Sur 2 IWP, 8MiGD Duqm IWPP, 300MW Duqm IPP</td>
</tr>
<tr>
<td>Qatar</td>
<td>200MW solar IPP, Hassyan coal plant, Ras Laffan IPP, Facility D IWPP 2280-2520MW, 123.5-136.5 MiGD</td>
</tr>
</tbody>
</table>

**GCC states maintain high spending**

Most countries in the bloc are continuing to spend to further the diversification of their economies.
Nuclear Power in GCC

An Alternative Source Towards Diversifying Energy Portfolio

- GCC commissioned on a feasibility study for a regional nuclear power and desalination program in 2007, with Saudi Arabia taking the lead.
- In 2013, KSA launched an ambitious 54GW Atomic & Renewables Energy Plan (KA-Care) but seems to have scaled back on this plan by pushing the goal from 2032 to 2040 under the new King.
- UAE is the only GCC country to date that pushed ahead to materialize a nuclear power program in consultation with IAEA.
- It accepted a $20 billion bid from a South Korean consortium to build four commercial nuclear power reactors, total 5.6 GWe, by 2020 at Barakah, Abu Dhabi.
- Construction of the first unit started in July 2012, and the second in May 2013. The first unit is more than 60% complete and is expected on line in 2017.

**UAE nuclear power reactors under construction and planned**

<table>
<thead>
<tr>
<th>Type</th>
<th>MWe gross</th>
<th>Construction start</th>
<th>Start up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barakah 1</td>
<td>APR-1400</td>
<td>1400</td>
<td>July 2012</td>
</tr>
<tr>
<td>Barakah 2</td>
<td>APR-1400</td>
<td>1400</td>
<td>May 2013</td>
</tr>
<tr>
<td>Barakah 3</td>
<td>APR-1400</td>
<td>1400</td>
<td>Sept 2014</td>
</tr>
<tr>
<td>Barakah 4</td>
<td>APR-1400</td>
<td>1400</td>
<td>2015</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5600 MWe</td>
<td></td>
</tr>
</tbody>
</table>
Funding Power Projects in GCC

Club Deals In Favor Over Syndications

• Demand for credit remains strong across the region with a healthy pipeline of infrastructure projects.
• Lending growth projected to be about 10%p.a in 2015.
• Loan syndication still an important feature for raising debt especially for bigger deals although on the decline as banks are more unwilling to take underwriting risks. Club deals are more prevalent nowadays.
Funding Power Projects in GCC

Short-term Financing Gains Popularity

- Mini Perms (MP) to become one of the major financing models in the future. Project Bonds (PB) to open another liquidity source for refinancing.
  - 7-year MP in UAE 1.6GW/52.5MiGD Mirfa IWPP in 2014
  - USD 825m PB in UAE 1.5GW/100MiGD Shuweihat 2 IPP in 2013

- ECAs participation (eg JBIC, KEXIM) still required for mega projects to expand liquidity source
- Increased participation of local banks to lend in local currency
  - A natural forex hedge with local denominated revenue stream
  - A natural hedge of local risks
  - Another source of liquidity

<table>
<thead>
<tr>
<th>MIRFA FACT BOX</th>
<th>SHUWEIHAT 2 FACT BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power capacity:</strong> 1,600 MW</td>
<td><strong>Award date:</strong> 2008</td>
</tr>
<tr>
<td><strong>Desalination capacity:</strong> 52.5 MiGD</td>
<td><strong>Power capacity:</strong> 1,500MW</td>
</tr>
<tr>
<td><strong>Power &amp; Water purchase agreement:</strong> 25 years</td>
<td><strong>Desalination capacity:</strong> 100 MiGD</td>
</tr>
<tr>
<td><strong>Debt bank finance:</strong> $1.2bn</td>
<td><strong>Power Purchase agreement:</strong> 25 years</td>
</tr>
<tr>
<td><strong>Loan duration:</strong> Seven Years</td>
<td><strong>Bank debt:</strong> $2.2bn (financed 2009)</td>
</tr>
<tr>
<td></td>
<td>$1.1bn direct loan – JBIC</td>
</tr>
<tr>
<td></td>
<td>$1.1bn loan – 14 banks</td>
</tr>
<tr>
<td><strong>Financial close:</strong> October 2014</td>
<td><strong>Bond issue:</strong> $825m (closed 2013)</td>
</tr>
<tr>
<td><strong>Project companies:</strong> Abu Dhabi Water &amp; Electricity Authority (80 per cent) and UK/French GDF Suez Energy International (20 per cent)</td>
<td><strong>Bond maturation:</strong> 2036</td>
</tr>
<tr>
<td></td>
<td><strong>Project companies:</strong> Abu Dhabi National Energy Company (54 per cent), Abu Dhabi Water &amp; Electricity Authority (6 per cent), UK/French GDF Suez Energy International (20 per cent), Japan’s Marubeni (10 per cent) and Osaka Gas (10 per cent)</td>
</tr>
</tbody>
</table>
Gas price is the key determinant
Region’s power generation is still dominated by gas fired power plants. With fuel subsidy under review and finite fossil resources, raising the efficiency of gas fired power plants expected to be a key theme in 2015
Combined Cycle technology can effectively double the efficiency of conventional open cycle power plants.
Many GCC countries pushing ahead with CCGT, either in new builds or conversion of existing open cycle GTs

### MAJOR COMBINED-CYCLE POWER CONVERSION PROJECTS IN THE MIDDLE EAST

<table>
<thead>
<tr>
<th>Country</th>
<th>Project Name</th>
<th>Project Owner</th>
<th>Capacity (MW)</th>
<th>Completion date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>Qurayyah power plant: combined-cycle conversion</td>
<td>Saudi Electricity Company</td>
<td>1,330</td>
<td>2014</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Al-Zour South power plant: combined-cycle conversion</td>
<td>Ministry of Electricity &amp; Water</td>
<td>560</td>
<td>2014</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Riyadh PPIO: combined-cycle conversion</td>
<td>Saudi Electricity Company</td>
<td>1,300</td>
<td>2015</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Shaybah power plant: combined-cycle conversion</td>
<td>Saudi Aramco</td>
<td>300</td>
<td>2016</td>
</tr>
</tbody>
</table>
Spending Continues Despite Falling Oil Price

Renewables Gaining Market Share Slowly

Most GCC still half hearted about Nuclear

Favoring Club Deals Over Syndication

Mini Perms – the likely financing model in the future

Stronger Emphasis on Fuel Efficiency

Power Sector Debundling, Privatisation, Market Liberalization

STATE OF POWER IN GCC
Case Study: A Successful Singapore Inc. Story in the Middle East

Salalah
Independent Water and Power Plant

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Utilities’ Developer-Owner-Operator Model
Creating Value

DEVELOPER

Project identification, acquisition and finance
• Business development
• Commercial and financial structuring

Project development
• Engineering capabilities
• Project management and execution

OWNER

Equity stake in asset
• Disciplined long-term investor with strong governance

OPERATOR

Asset management
• Engineering and technical capabilities
• Operation and maintenance (O&M)
• Fuel management and trading
• HSE management

Strong Track Record
Proven capabilities in identifying, securing, financing and executing large-scale energy and water projects

Oman
UAE
China
Vietnam

Singapore
India
Singapore
Sembcorp Salalah

Overview

Sembcorp Salalah location

<table>
<thead>
<tr>
<th>Project details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment</td>
<td>USD 1 Billion (SGD 1.3B)</td>
</tr>
<tr>
<td>Shareholding (post IPO)</td>
<td>Sembcorp 40%, OIC/BDCC 25%, Public 35%</td>
</tr>
<tr>
<td>Financing</td>
<td>USD 750mil PF loans from consortium of 7 banks</td>
</tr>
<tr>
<td>Contracted power</td>
<td>445 MW / 500 MW</td>
</tr>
<tr>
<td>capacity/Gross Capacity</td>
<td></td>
</tr>
<tr>
<td>Contracted Seawater</td>
<td>15 MIGD (69,000m³/day) RO</td>
</tr>
<tr>
<td>Desalinated Capacity</td>
<td></td>
</tr>
<tr>
<td>COD</td>
<td>May 2012</td>
</tr>
<tr>
<td>Contracted term</td>
<td>15 years (to 2027) “Take or Pay” Power &amp; Water Purchase Agreement with Oman Power &amp; Water Procurement Co</td>
</tr>
<tr>
<td>O&amp;M contract</td>
<td>15 years with Sembcorp Salalah O&amp;M Services Company LLC</td>
</tr>
<tr>
<td>EPC Contractor</td>
<td>SEPCOIII</td>
</tr>
<tr>
<td>Current Contribution to</td>
<td>Power: 70% of demand Desalinated Water: 100% of demand</td>
</tr>
<tr>
<td>Salalah System in 2014</td>
<td></td>
</tr>
</tbody>
</table>


IPO Price: ~USD4 /share
Current Price (May2014):~USD6.5/share
Financing Conceived in 2008/09
Financial Crisis

- Secured USD750million long term non recourse project finance debt using 7 banking institutions.
- Tap into unprecedented funding sources eg. chinese financing and chinese ECA
One of the earliest GCC IWPP Projects to Emerge from the Financial Crisis in 2009

November 2009

The government of Oman awarded the Salalah Independent Water and Power Plant project to Semcorp Salalah Power & Water Company.
Project Implementation (2010-2012)
• First Utility Developer to engage Chinese EPC Contractor (SEPCOIII) in GCC IWPP and to use chinese key equipment (eg STs, HRSGs).
• First Developer to complete successful COD with Chinese EPC Contractor.
• Challenges include:-

i. Language & communications
ii. Handholding contractors who are new to the market and the local demands
iii. Reconciliation of chinese design standards and international standards
iv. Difficult terrain with coastal construction – plant perched on top of a 40m cliff
v. Extreme weather – Cyclone Keila in Year 2011
vi. Commissioning in an isolated grid where there is only another power plant half the capacity.
Salalah IWPP in Full Commercial Operation since May 2012
A Successful IPO

- Listed on Muscat Securities Market on 8th October 2013
  - Existing Shareholders to sell 35% of their equity via the Muscat Stock Market ("MSM").
  - Shares are 8x oversubscribed from mainly GCC and Omani investors

Sembcorp Salalah shares soar over 24pc on debut

October 08, 2013, 7:52 pm
Time of entry

Sembcorp Salalah Power & Water Company soared 24.53 per cent to close at OMR1.905 on hectic demand on the first day of listing on the Muscat Securities Market (MSM).

The company’s share gained 380 baisas or 24.53 per cent compared to its offer price of OMR1.500 per share amid demand for 11.03 million shares on debut. The share touched a high of OMR2.002 when the trading started, but declined to a low of OMR1.910 before settling down at OMR1.905.

Key statistics on the first trading day as follows:
- Closing price RO 1.925 (a 21% increase)
- Volume traded 11,033,780
- Turnover RO 21,859,580
- Number of trades 5,509
Asset Management - Impressive Plant Performance

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Reliability</td>
<td>(%)</td>
<td>99.4</td>
<td>99.1</td>
</tr>
<tr>
<td>Power Reliability</td>
<td>(%)</td>
<td>99.9</td>
<td>99.5</td>
</tr>
<tr>
<td>Quantity of Water Sold</td>
<td>(Thousand m³)</td>
<td>23,653</td>
<td>16,754</td>
</tr>
<tr>
<td>Quantity of Power Sold</td>
<td>(MWh)</td>
<td>1,710,976</td>
<td>1,860,152</td>
</tr>
<tr>
<td>Plant Load Factor (Power)</td>
<td>(%)</td>
<td>43.9</td>
<td>47.7</td>
</tr>
<tr>
<td>Plant Load Factor (Water)¹</td>
<td>(%)</td>
<td>95.0</td>
<td>67.3</td>
</tr>
</tbody>
</table>

¹ The Company started dispatching water in 1Q2013 when the water transmission system was ready.

Financial Performance

Key financial performance indicators are shown below:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>RO million</td>
<td>62.77</td>
</tr>
<tr>
<td>EBITDA</td>
<td>RO million</td>
<td>45.06</td>
</tr>
<tr>
<td>PBIT</td>
<td>RO million</td>
<td>34.21</td>
</tr>
<tr>
<td>Profit after tax</td>
<td>RO million</td>
<td>12.81</td>
</tr>
</tbody>
</table>
Our Sustainability Initiatives

❖ Sponsors Road Safety Campaign

❖ Signing of CSR agreement with Mirbat Wali

❖ Programs for Omani Students

❖ Celebrating World Environment Day
An Award Winning Project Developed by Sembcorp

Year 2011

Winner of 2011
Global Water Intelligence
Global Water Awards – Desalination Deal of the Year

Year 2014

MEEA Awarded the Certificate of Recognition in the HSE Project or Initiative for the year 2015
Sembcorp Salalah Company Video
Questions & Answers

شكراً .......Thank you